Water

P.E.I.'s MOST PRECIOUS RESOURCE

MILL-TROUT RIVERS COMPLEX

WATERSHED ACTIVITIES

SURFACE WATER PROGRAM

MARCH 1990

THE CANADA–PRINCE EDWARD ISLAND
WATER MANAGEMENT AGREEMENT

Environment Canada Environnement Canada

Prince Edward Island
Department of the Environment

MILL-TROUT RIVERS COMPLEX

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WATER MANAGEMENT AGREEMENT

Prepared by:

Environment Canada
Inland Waters Directorate
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P.E.I. Department of the Environment
Fish and Wildlife Branch

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PREFACE

This report is one of a series produced as a result of the Canada - Prince Edward Island Water Management Agreement. The work was performed as part of the Watershed Inventory Project under the Surface Water Program.

It was initiated in order to gain a better understanding of the activities which may impact on the quality and quantity of surface waters drained by the Mill, Trout and Foxley Rivers.

The report is intended to be used in conjunction with the report entitled "Activities Affecting Surface Water Resources - A General Overview" and the book of "Mill - Trout Rivers Watershed Complex Inventory Maps" which is maintained on file at Inland Waters Directorate, Environment Canada in Dartmouth, Nova Scotia. All references to maps in this report are to the atlas.

Mapping is performed on the 1:50,000 N.T.S. topographical series using the Universal Transverse Mercator (U.T.M.) grid system to the nearest one hundred (100) metres for point data. Non-point (polygon) data is also mapped where applicable. This data is available on diskette and is transferable to Geographical Information System (G.I.S.) thereby providing for updating and manipulation of the data.

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1.0 INTRODUCTION

In November 1987, the Canada - Prince Edward Island Water Management Agreement was signed. The Agreement will focus upon several areas including groundwater contamination, surface water degradation and estuarine eutrophication. Of these, the Watershed Inventory Project, under the Surface Water Program, has been designed to identify current and future users of surface water and to document resource conflicts within twelve watersheds across the province. The Mill - Trout Rivers Watershed Complex was identified as a study area for the project (Figure 1.1).

2.0 GENERAL CHARACTERISTICS OF THE MILL - TROUT RIVERS WATERSHED COMPLEX

2.1 Physiography

The several glaciers which at one time covered Prince Edward Island have caused a gently undulating terrain across much of the province. Average elevation is less than sixty-one (61) metres above sea level. The Mill - Trout Rivers Watershed Complex encompasses a section of the Island which is generally rolling where maximum elevations reach sixty (60) metres.

The Mill - Trout Rivers Watershed Complex is largely rural with farm villages and hamlets, the largest of which is O'Leary (population 830), scattered throughout. As is the case with the Island as a whole an extensive network of roads traverses the area. Many are unpaved and are not kept open during the winter months.

The Mill - Trout Rivers Watershed Complex is located in the West Prince area of P.E.I. The Mill, Trout and Foxley Rivers each drain a number of tributaries with the entire Complex then emptying into Cascumpec Bay. The Bay, in turn, opens to the Gulf of St. Lawrence.

The watershed drains a land base of three hundred and five square kilometres (305 km^2) through two hundred and forty-four kilometres (240 km) of streams and rivers. Physiographic analysis (Figure 2.1) has provided the following statistics (Taylor, 1988).

The figures reveal that forty-five percent (45%) of the land is cleared. Individually, the Mill and Trout subwatersheds consist of lands that are forty-nine (49) and forty-one (41) percent cleared, respectively.

Prince Edward Island is an agriculture-intensive province with many types of operations present within the Mill - Trout Rivers Watershed Complex. Much of this land is suitable, and used extensively for the production of potatoes (the main crop) and their rotation crops (carrots, peas, grain and

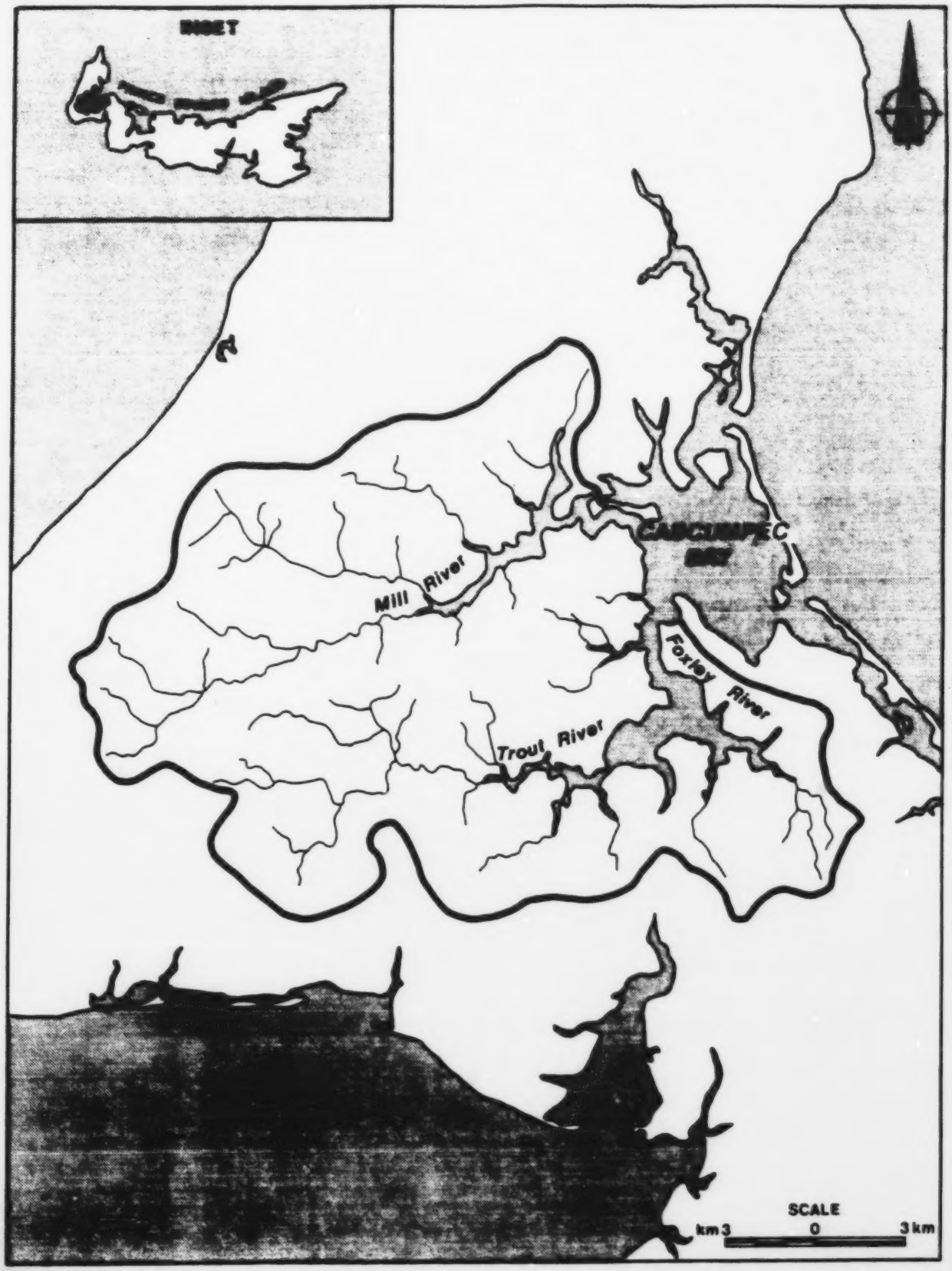

Figure 1.1 Mill — Trout Rivers Watershed Complex

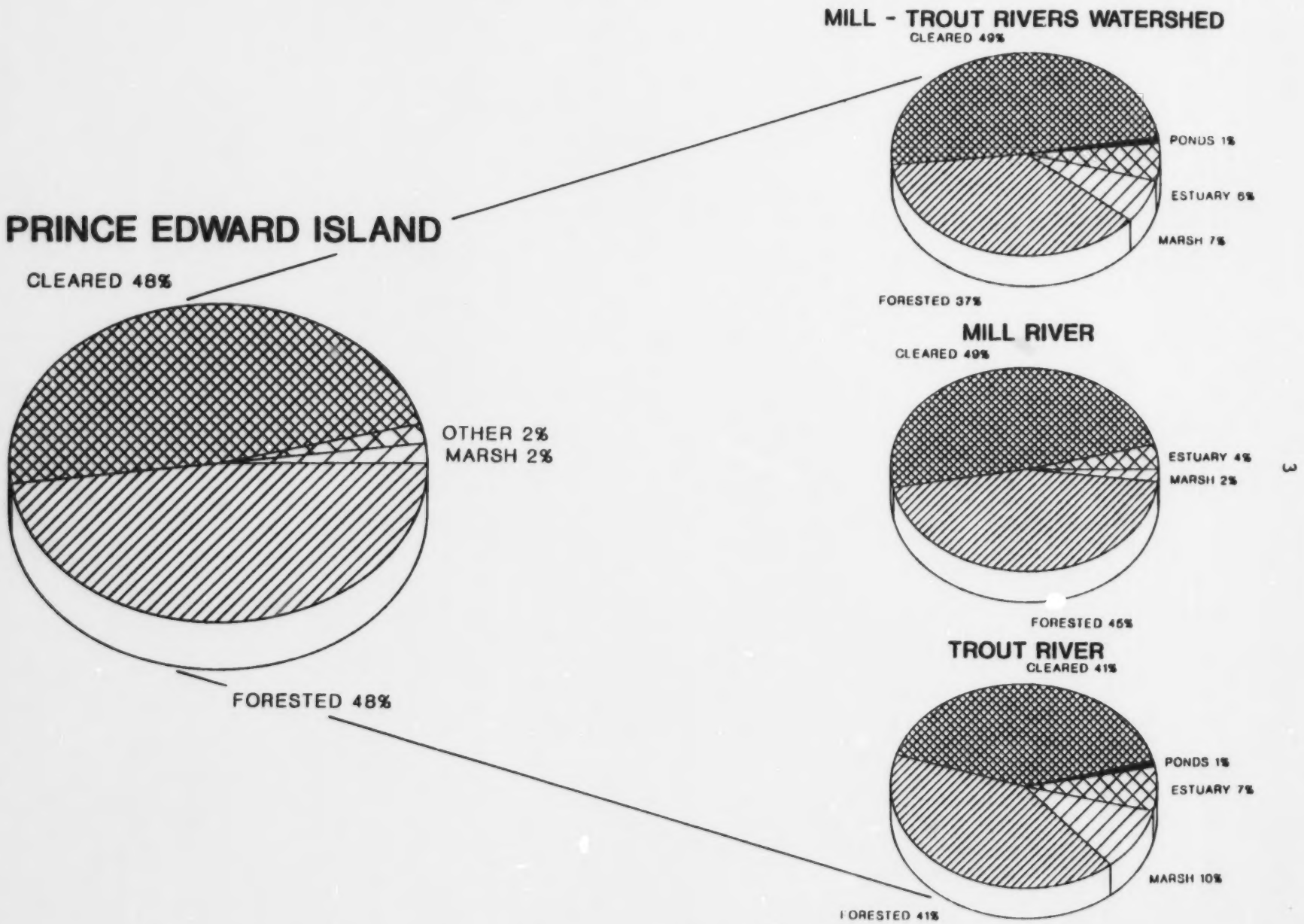

Figure 2.1 Comparison of Physiography Between Prince Edward Island and the Mill — Trout Rivers Watershed Complex

other food crops) and livestock.

2.2 Soils

Prince Edward Island's podzol soils, formed mainly from the weathering of sandstone, are generally stone-free, sandy and permeable. The Mill - Trout Rivers Watershed Complex is composed of varying amounts of Class 0, 2S, 3S, 3^{S}_{W}, 4T, 4^{S}_{W}, 4^{S}_{T}, 5^{S}_{W}, 5S, 7, 7I and 7^{S}_{W} class soils. Approximately thirty percent (30%) of the soils are Class 2, fifty-five percent Class 3 (55%), ten (10) percent Class 4 while the remainder is Class 5 and Class 7 (Canada Land Inventory, 1968).

3.0 AGRICULTURAL OPERATIONS

Agriculture forms a major part of Prince Edward Island's economy. The Mill - Trout Rivers Watershed Complex's terrain is well-suited for crop production, with large fields present throughout. There are also a large number of livestock operations located throughout (Maps 21I/9 and 21I/16).

3.1 Dairy Operations

Thirty-two (32) dairy operations (Figure 3.1) each containing thirty (30) or more head (30 milkers and 30 feeders) of cattle are located within the watershed (Harris and Kiminski, 1988).

3.2 Beef Operations

Forty (40) beef cattle operations (Figure 3.1) with fifty (50) or more head (50 cattle plus 50 feeders) are present (Colwill, 1988).

3.3 Hog Operations

There are twenty-four (24) hog operations (Figure 3.1) located within the boundaries of the watershed. Each has an annual production of eight hundred (800) or more animals (Delaney, 1988). Since hogs are normally housed indoors the only threats to surface waters are as a result of improper storage and disposal of the liquid manure.

3.4 Poultry Operations

There are also two large scale poultry operations (Figure 3.1) in the watershed (Colwill, 1988).

3.5 Fox Farms

Two fox farms of significant size are found within the watershed (Figure 3.1).

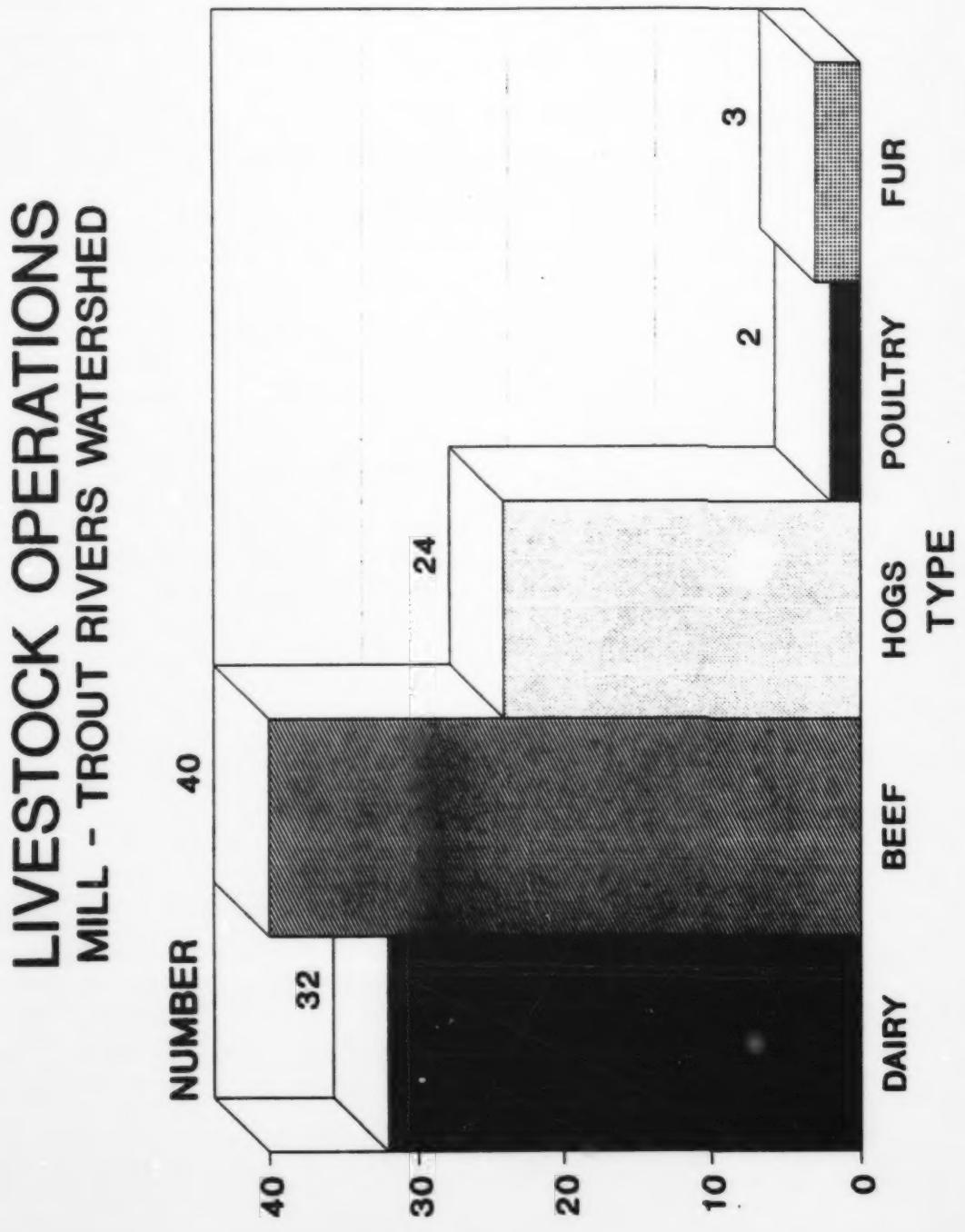

Figure 3.1 Livestock Operations Within the Mill — Trout Rivers Watershed Complex

3.6 Irrigation

The Prince Edward Island Department of Agriculture does not keep specific records on irrigation within the province. Water used for irrigation generally comes from a surface water source such as a farm pond or stream. However, in crop-intensive areas there are probably a fair number of farmers who regularly irrigate their crops especially during drier years (Clough, 1988). Therefore, a system should set up in order to monitor the amount of water available for other users.

3.7 Dead Stock Burial

There are not any commercial dead stock burial sites located within the Mill - Trout Rivers Watershed Complex. Farmers may either pay a service fee to have their stock transported to an approved disposal site located outside of the watershed, sell their dead animals to Maritime Pet Foods (located in Hunter River) or dispose of them on their own property.

3.8 Erosion Control Projects

There are fifteen erosion control projects throughout the watershed. Of those, fourteen are tile drainage projects (Maps 21I/9 and 21I/16) which have enabled farmers to turn wet, non-productive areas into more agriculturally-suited lands (DeHaan, 1989).

Eleven of the tile drainage systems were installed prior to Agriculture Canada's Soil and Water Conservation and Management Program (Brown, 1988). Since the Soil and Water Conservation and Management Program was initiated in June 1984 four additional systems have been installed.

There is also a grassed waterway project which is useful in controlling the velocity of runoff water (Maps 21I/9 and 21I/16).

3.9 Manure Storage and Disposal

Since there are a relatively large number of livestock operations within the watershed, the potential problems arising to the quality of surface waters due to manure runoff exist and have been documented (Murphy and Matte, 1983).

4.0 FISH AND WILDLIFE RESOURCES

Fish and wildlife play an important part in the recreational lives of both residents and tourists on Prince Edward Island. Fish and wildlife on P.E.I. are dependent upon surface water resources either for primary habitat or as a source of drinking water.

4.1 Angling Areas

There are numerous angling sites along the rivers within the Mill - Trout Rivers Watershed Complex, including seven listed in the P.E.I. Department of Tourism and Parks publication Angling on Prince Edward Island. The remaining sport fishing areas within the watershed were outlined by the P.E.I Fish and Wildlife Branch's Conservation Officer responsible for the area (Maps 21I/9 and 21I/16), (MacDougall, 1988).

4.2 Hunting Areas

Much of the shoreline along the Mill River and Trout River is good for hunting (MacDougall, 1988). The large amount of food crops grown, in particular grain, provide significant feeding areas for waterfowl. The many woodlots and hedgerows separating large fields provide excellent habitat for other animals such as snowshoe hare and ruffed grouse. Other type of game hunted include Hungarian partridge, snipe and woodcock. Since wildlife's movements depend on habitat requirements and food availability the delineated boundaries may change from year-to-year (Maps 21I/9 and 21I/16).

4.3 Trapping Areas

As with hunting areas, the trapping areas (Maps 21I/9 and 21I/16) do not have consistent boundaries from year-to-year. They are dependent upon the movement of animals and the preferences of trappers. For the most part, trapping occurs within close proximity to surface waterways. Species trapped include beaver, muskrat, mink and fox (MacDougall, 1988). The amount of activity depends largely on the fur market conditions.

4.4 Beaver Activity Areas

Beaver-built dams result in the creation of flowages which provides habitat for additional wildlife species but which also can affect the ability of finfish species to pass through the site on their way to upstream or downstream areas. There are thirteen beaver activity sites within the Mill - Trout Rivers Watershed Complex (Maps 21I/9 and 21I/16). Beaver, which have recently been reintroduced to the area, are present in sufficient numbers to allow for a trapping season (Dibblee, 1988).

5.0 RECREATIONAL ACTIVITIES

Surface water and some recreational activities go hand-in-hand (swimming and boating). Other activities (hiking and skiing) are often enjoyed in close proximity to streams and

rivers. Similarly, major recreational facilities (provincial parks and campgrounds) are generally situated on or adjacent to Island surface water resources.

5.1 Provincial Parks / Private Campgrounds

Two provincial parks are located within the watershed. Mill River Provincial Park and Bloomfield Provincial Park (Map 21I/9) offer picnic and day-use facilities. Additionally, Mill River Provincial Park has campsites, a theme park, motel and golf course.

The single private campground, Foxely River Haven Campground (Map 21I/9), has a beach on its property.

5.2 Swimming Areas

Generally, people will swim where they desire. On P.E.I., most of the good swimming areas are coastal. Some areas used by swimmers are located at Foxley River Haven Campground and Mill River Provincial Park (Map 21I/9). Additional swimming locales include ponds, near bridges and the wider sections of the rivers dependent upon ease of access and tidal characteristics. The Canadaian Red Cross Society does not conduct organized swimming events in this part of the province (MacLean, 1989).

5.3 Boating / Canoeing Areas

Despite the attractiveness for boating and canoeing, launching sites along the rivers are limited. Most power boats enter the Mill River or Trout River from Alberton Harbour via a launching ramp located at the public wharf (Map 21I/16). The wharf, with a capability for accommodating larger boats (sailboats and yachts), is located just outside of the watershed boundary. Deeper draft boats cannot sail up the shallow sections of the rivers.

The Prince Edward Island Recreational Canoeing Association is able to provide additional information on various canoeing routes (Maps 21I/9 and 21I/16) throughout the province but does not offer any organized trips (P.E.I. Department of Tourism and Parks, n.d.). Rentals of boats and canoes are available at Mill River Provincial Park. Mill River is suitable for canoeing from Fortune Cove to the Highway #2 Bridge. The Trout River, between Highway #2 and Highway #12, is frequently used by the Canadian Red Cross Society as a canoe route during their summer programs (Mills, 1988).

Boardsailing (windsurfing) is gaining popularity on P.E.I. The tidal sections of the Mill and Trout Rivers, which open to Cascumpec Bay provide most of the windsurfing activity in the area.

5.4 Hiking / Cross-Country Skiing / Snowshoeing

For the nature-buff or recreational enthusiast, a good method in which to see an area is on foot, either by hiking, cross-country skiing or snowshoeing. In this way, people can go at their own pace, perhaps photographing what catches their eye, or just enjoying the great outdoors.

There are two organized hiking / cross-country trails within the Mill - Trout Rivers Watershed Complex. Both are in Mill River Provincial Park and are short, day trails. Rail lines and trails on private lands are also used as recreational venues by residents and visitors. Additional areas include the many unpaved or unplowed roads.

Snowshoeing activities may be undertaken anywhere within the watershed. However, the areas utilized for hiking and/or cross-country skiing are most likely to have the highest use for snowshoers.

5.5 Snowmobiling / Horseback Riding

There are not any snowmobiling clubs located within the Mill - Trout Rivers Watershed Complex and, therefore, no organized excursions. Snowmobilers, most likely, utilize seasonal roads, rail lines, wood's roads and fields as trails.

There are no commercial horseback riding operations although there have been horses noted in several pastures. It can be assumed that recreational trail riding does occur on a limited scale.

5.6 Unplowed (Seasonal / Scenic Heritage) Roads

Many local and unpaved roads are not kept open for vehicular traffic during the winter months (Maps 21I/9 and 21I/16). Their relative abundance provides excellent venues for winter recreational activities such as cross-country skiing, snowshoeing and snowmobiling. Often not well travelled even during the warmer months, the roads are also used for hiking, cycling and horseback riding.

Several roads across the province have been designated as Scenic Heritage Roads due to their historical and natural significance. There have not been any such designations within the Mill - Trout Rivers Watershed Complex although one is currently under consideration (Horne et. al. 1988).

5.7 Golf Courses

During the summer months many Island golf courses water their greens and tees on a regular basis. Water used for irrigation purposes are either drawn from ground or surface sources.

There is one golf course in the watershed (Map 21I/9). The Mill River Golf Club, located in Mill River Provincial Park, is irrigated using groundwater.

6.0 FISHERIES OPERATIONS

The fisheries industry is very important to the economy of Prince Edward Island. All major Island watersheds have an estuarial component thereby supporting a fishery to some extent. All finfish and shellfish harvesting can be placed into three broad categories, namely; licensed commercial, non-licensed commercial and recreational and finfish aquaculture.

6.1 Licensed Commercial

Some sections of the Mill River and Trout (Foxley) River estuaries are classed as public fishing domain. As such, there are not any suspended or ground shellfish leases and fisherman can remove shellfish in season. Other areas are specific leased areas or zones and can be fished only by the lease owner (Small, 1988).

The primary public oyster harvesting areas are indicated in Maps 21I/9 and 21I/16. Spat collection is also permitted in one location. Quahogs and soft-shelled clams are also harvested in these rivers on both a commercial and non-commercial basis. There is also a commercial harvest of uncultivated (wild) mussels. There has been concern expressed over reports of the excessive commercial harvest of soft-shelled clams and it is possible that only recreational harvests will be permitted in the future (Small, 1988).

The watershed is open to eel netting annually from August 15 to November 30 and to eel spearing on a year round basis. Box nets are used to trap smelt during the annual season (October to February). Catches are regulated by season and are monitored by Department of Fisheries and Oceans personnel. Gaspereau catches are not significant in the area as a result of overfishing (Blackadar, 1988).

The value of the fish and shellfish related to non-oceanic species landed at Alberton in 1987 was approximately $238,700 (Figure 6.1). Areas of greatest shellfish concentration within the Mill River and Trout River estuaries have also been identified (Maps 21I/9 and 21I/16), (Blackadar, 1988).

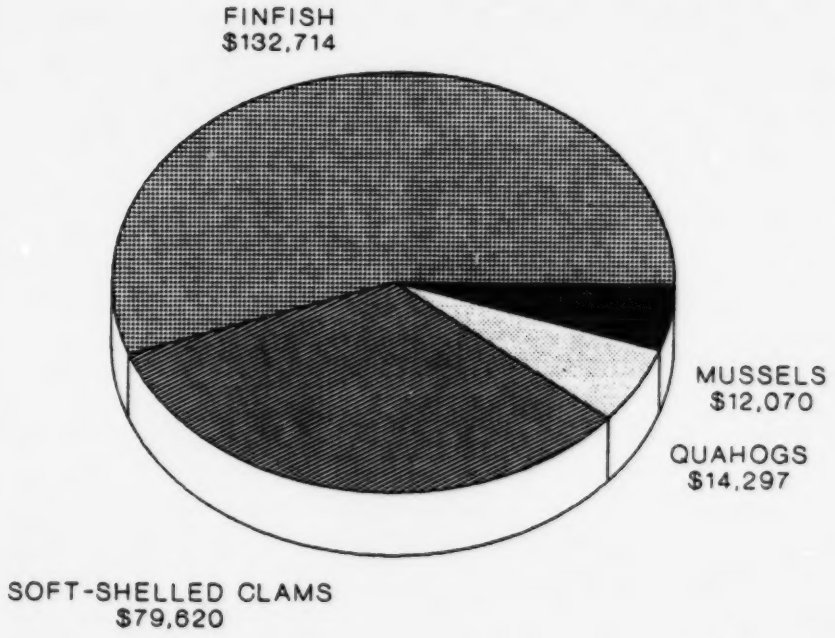

Figure 6.1 Alberton Fish/Shellfish Landings (1987)

6.2 Non-Licensed Commercial / Recreational

Trout, salmon, smelt and mackerel are harvested on a recreational basis. Quahogs, clams and mussels are also harvested from public areas.

Despite the closure of parts of both the Mill River and Trout River estuaries due to bacterial contamination (Maps 21I/9 and 21I/16) they currently support significant non-licensed commercial as well as recreational finfish and shellfish harvests. The shellfish which are removed from the contaminated areas are transferred to unpolluted areas for flushing (a period of three to four weeks). However, people who harvest shellfish from the contaminated areas must first obtain a conditional permit from the Department of Fisheries and Oceans. It has been decided that due to the extent of the bacterial contamination within the Mill River estuary there will be no conditional permits issued during the 1989 season.

6.3 Finfish Aquaculture

Finfish aquaculture takes place at one location in the watershed. The Department of Fisheries and Oceans maintains a salmon rearing station on Long Creek near Rosebank (Map 21I/16). The salmon are raised at this site and later released to the Morell and Mill Rivers (Blackadar, 1988).

7.0 INDUSTRIAL OPERATIONS

Many of the industrial operations on Prince Edward Island have an effect on surface water resources in one way or another. Some discharge both treated and untreated wastes directly into streams and rivers, while others allow for the seepage of pollutants to surface or groundwater sources. Some industrial operations require a surface water source for use in their processes.

7.1 Stormwater Drainage

There is a stormwater drainage system located at O'Leary (Map 21I/9). The precise location of its three outlets is unknown to civic and provincial officials but all outlets are believed to drain into the upper reaches of the Beaton River, a tributary of the Trout River.

7.2 Sewage Lagoons

Both the community of O'Leary and Amalgamated Dairies Limited are served by a two cell facultative lagoon (Map 21I/9). Flow is not metered and the system serves/treats four hundred and forty-one (441) single-family equivalent units (Hogan, 1988).

Rodd's Mill River Resort in Mill River Provincial Park has an on-site secondary sewage treatment plant (Map 21I/9) .

The Mill River Fun Park (Map 21I/9), a private enterprise, has an on-site two cell total retention lagoon. The potential for overflow exists here if the effluent is not drawn down seasonally in the manner prescribed by the P.E.I. Department of the Environment (Reeves, 1988).

7.3 Food and Beverage Industry

The watershed has two food industry operations of significance located within its boundaries.

7.3.1 Green Acres Produce

Green Acres Produce, located in St. Anthony (Map 21I/9), washes and packs potatoes for the fresh market. The used wash water is treated to remove silt through settling in a holding lagoon located behind the plant. However, because production has been higher than expected, the lagoon has proven to be too small and is currently (March 1989) being bypassed. The waste water with its silt load is eventually flowing into a stream and then into the Trout River.

7.3.2 Getson's Meat Shoppe

Located in Rosebank (Map 21I/16) this business

slaughters livestock and operates as a cannery. Waste water is disposed of through an on-site septic system.

7.4 Abandoned, Active and Unapproved Dump Sites

During 1982-83 the P.E.I. Department of Community and Cultural Affairs, in conjunction with Environment Canada, performed a study in which abandoned, active and unapproved waste disposal sites on Prince Edward Island were located and inspected (Water Resources Section, 1983). Of prime concern during the Inventory was the potential for groundwater contamination. Thirteen sites were identified in the watershed (Maps 21I/9 and 21I/16).

During the Inventory, a scoring system was used to rate and priorize (Priority I, II and III) each site on the basis of actual and potential environmental effects. Priority I sites were rated as being most hazardous to the environment; Priority II dumps were less hazardous; while Priority III sites were generally very small discriminate sites which were not considered to be environmentally hazardous. Evaluation revealed four Priority II and nine Priority III sites.

The Air and Solid Wastes Branch, P.E.I. Department of Community and Cultural Affairs, identified three active dumps at O'Leary, Roxbury and Conway (Maps 21I/9 and 21I/16).

There is no established program for hazardous waste disposal on Prince Edward Island (Curley, 1988). However, the Air and Solid Wastes Branch cooperates with their Federal counterparts in controlling toxic waste disposal. For example, asbestos, which has been removed from buildings is double-bagged and dumped at landfill sites. Agricultural pesticides, however, are sometimes left at dumpsites illegally. Since it is difficult to regulate such practices, remnant chemicals could become a potential hazard to both surface and groundwater sources.

The only other major form of toxic wastes on P.E.I. are polychlorinated biphenols (PCB's). As these compounds do not break down under normal conditions they must be stored until they can be transported to a proper disposal site (currently located off-Island). There are no registered PCB-user or storage sites in the watershed (The Guardian-Patriot, 1988).

7.5 Excavation Pits

Scattered throughout Prince Edward Island are numerous excavation pits used for the private and commercial removal of sandstone, gravel and sand. Five registered active excavation pits (Maps 21I/9 and 21I/16) are located in the watershed. Records are kept concerning the quantity of material removed from the individual pits and there are other pits for which permits have not been obtained. As well, records are not maintained concerning the number of non-

operational or abandoned pits (Murphy, C., 1988).

7.6 Salt / Sand Storage Locations

The P.E.I. Department of Transportation and Public Works maintains a number of salt/sand storage areas across the Island. At these temporary sites, the salt and sand is stored directly on the ground with little or no site preparation. The locations of these secondary sites change often annually thereby yielding both abandoned and active sites. One active site and one proposed site have been identified within the watershed. Both are in O'Leary (Map 21I/9).

7.7 Snow Dumping Sites

There are not any major problems associated with snow accumulation on streets and roads in the watershed because of the small size of the communities. Snow is usually plowed either into the ditch or onto the nearest open field or lot.

7.8 Additional Industrial Activities

The Elite Seed Farm, located on Fox Island at the mouth of the Mill River (Map 21I/16), is a seed potato research establishment. By its nature, the operations and experiments carried out on-site differ from year to year and it is difficult to say with certainty the degree of any effects the operation has on the quality or quantity of surface water.

8.0 ALTERATIONS OF NATURAL FEATURES OF WATERWAYS

Individuals or groups wishing to alter the natural features of a waterway directly or indirectly to improve the recreational potential, to provide a reservoir for agricultural purposes or fire protection or to construct a stream crossing, must seek approval from the P.E.I. Department of the Environment (refer to Environmental Protection Act, Section 10).

8.1 Application Process and Requirements

Alteration applications are subject to government control under the P.E.I. Environmental Protection Act (refer to Section 10) and the Canada Fisheries Act (refer to Chapter F-14, Section 20). Before requests are given final approval by the Head of the Watercourse Alteration Advisory Committee, they are reviewed by several Federal/Provincial government and private agencies. Once approval is granted, inspections are carried out to ensure that the recommendations of the Committee are being followed. If not, the appropriate repairs are performed by an approved contractor at the expense of the applicant.

Application considerations include the following

criteria: the well-being of the fishery resource (primary); possible changes in water quality; stream-side cutting leading to loss of essential food and cover; and the effects on other types of wildlife.

Types of alterations include, but are not limited to; installation of dams and/or fishways, bypass pond construction, roadway culvert installation, rock gabion installation and the infilling of marshes. Infilling applications are usually rejected since the practice results in a loss of wildlife habitat.

Since P.E.I. soils are highly susceptible to erosion, proponents who alter waterways must undertake erosion control measures immediately upon completion of the proposed construction.

8.2 Dam Inspections

Most of the twenty-three (23) dams in the Mill - Trout Rivers Watershed Complex (Maps 21I/9 and 21I/16) were inspected during the Watershed Inventory Project. Eighteen of the dams are located within the Mill River subwatershed and five within the Trout River subwatershed. Some dams were found to constitute a barrier to fish passage. The reasons for this were due either to the design of the dams, breakdown of the structures or debris within the waterways (refer to Section 11.3). Some dams were found to be a barrier only to some species of fish while others were breached (washed out). Descriptions of the dams within the Mill - Trout Rivers Watershed Complex which were inspected are contained in Appendix A.

8.3 Fishways

On Prince Edward Island, whenever an alteration is made to a waterway, the continued passage of fish must be ensured (Canada Fisheries Act, Chapter F-14, Section 20, Subsection 1). This involves, in some cases, the construction of a fishway. Various fishway designs are available with the type used dependent upon the species of fish to be passed and the water level fluctuations within the impoundment.

Two fishways located within the watershed were identified and field checked (Maps 21I/9 and 21I/16). An abandoned pool and weir fishway located at Profits Pond (semi-natural rearing) was found to be a complete barrier to fish passage. A new structure (eleven step pool and weir) was installed at Leards Pond (Coleman) in 1989.

8.4 Road - Stream Intersections

The P.E.I. Department of Transportation and Public Works maintains a reference map which provides an up-to-date record of all major highway structures (over 1.2 metres) in

diameter) within the province. The Mill - Trout Rivers Watershed Complex contains fifty-one (51) such structures (Maps 21I/9 and 21I/16).

The Watershed Inventory Project also identified seventy-two (72) additional road - stream crossings which are not kept on file at the Department of Transportation and Public Works (Maps 21I/9 and 21I/16). These areas were located via 1:50,000 N.T.S. maps but most have not been inspected.

8.5 Railway - Stream Intersections

Earlier this century, railroads on Prince Edward Island were a vital component in the transportation of goods across the Island. However, due to increased rail costs and more efficient trucking methods, its importance is rapidly decreasing. Therefore, all lines across the province were abandoned effective January 1990.

Once a line is abandoned, CN Real Estate contracts out for the removal of the ties and rails. Crossing structures are not usually removed since they are often more useful if left in place.

The rail lines incorporate eleven major stream crossings (Maps 21I/9 and 21I/16) which are constructed of an assortment of materials. Problems relating to fish passage may result if regular inspection and maintenance of the crossings are stopped after abandonment.

9.0 WETLANDS

Wetlands include salt marshes, intertidal flats, bogs, marshes, swamps and ponds. They are important for many reasons (Canadian Wildlife Service, n.d.):

1. wildlife habitat;
2. act as natural filters;
3. bind pollutants thereby slowing the eutrophication process;
4. reduce flooding by acting as reservoirs; and
5. recharge the groundwater supplies.

During 1983 - 84 all wetlands in the province which were over 0.25 hectares in size were inventoried. The objective of the program was to provide information on the classification, size, distribution and wildlife value of all wetlands.

9.1 Freshwater Wetlands

All freshwater wetlands were identified during the above-mentioned inventory and were given a wildlife value based on a wide array of parameters. The wetlands received a

score between 36 and 108 with a score of 60+ indicating generally more productive areas.

Forty-eight (48) freshwater wetlands with a score of 60+ were inventoried (Table 9.1) in the Mill - Trout Rivers Watershed Complex (Maps 21I/9 and 21I/16), (Canadian Wildlife Service, n.d.).

Table 9.1 Wetlands Located Within the Mill — Trout Rivers Watershed Complex

SUBWATERSHED	FRESHWATER	COASTAL	TOTAL
Mill	13	13	26
Trout	35	24	59
TOTAL	48	37	85

9.2 Coastal Wetlands

Coastal wetlands were classified and scored as coastal units during the inventory project. The coastal unit score was calculated using the total of the scores from six component types of wetlands, along with five additional factors and added to that was a value for the disturbance status of the unit. The total coastal unit score indicated its productivity and provides a measure of its importance to wildlife. The scores ranged from 10 to 1500 points and were indicated as the sum of all wetlands within the unit.

There are thirty-seven (37) coastal wetlands (Table 9.1) in the Mill - Trout Rivers Watershed Complex (Maps 21I/9 and 21I/16), (Canadian Wildlife Service, n.d.).

9.3 Ducks Unlimited Canada Management Sites

Ducks Unlimited Canada is active on Prince Edward Island in the preservation and enhancement of wildlife habitat. Several types of management techniques are employed for this purpose. Installation of water control devices such as drop inlets and stoplog control structures allow for the creation of ponds and the regulation of water levels in order to maintain optimal habitat conditions. Fishways are usually installed with the water level control structures in order to allow for the continued passage of fish into and out of the newly created impoundments.

There is one Ducks Unlimited site in the watershed. It

is located at Leards Pond in Coleman (Map 21I/9).

10.0 ADDITIONAL WATERSHED ACTIVITIES

10.1 Hydrometric Stations

During the period 1919 to 1922, the Water Quality Branch of the Inland Waters Directorate, Environment Canada maintained a hydrometric station (NAQUADAT No. 01CC001) at Carruthers Brook near Howlan. An additional station (NAQUADAT No. 01CC003) was established in 1961 on the same brook near St. Anthony. The stations measure monthly and annual mean water discharges.

Land use characteristics for the basins draining to each of these stations have been determined by Inland Waters Directorate, Environment Canada in Dartmouth, Nova Scotia and appear in Table 10.1.

Table 10.1 Land Use Characteristics of Hydrometric Stations Located Within Mill — Trout Rivers Watershed Complex

Station Number	Drainage Area (km^2)	Forest Area (km^2)	Cleared Area (km^2)	Swamp Area (km^2)	Pond Area (km^2)	Basin Perimeter (km)	Total Length of Stream (km)	Stream Gradient (%)	Period of Record
01CA001	40.30	25.00	13.30	1.90	0.0	25.60	34.40	0.33	1919-1922
01CA003*	48.00	27.20	18.80	2.00	0.0	33.20	42.60	0.32	1961-PRESENT

* ACTIVE

In addition, the Water Quality Branch, Inland Waters Directorate, Environment Canada in Moncton, New Brunswick also maintains limited data associated with the following studies:

- P.E.I. Groundwater Study (May 1972 - September 1973);
- P.E.I. Surface Water Quality Survey (July 1972);
- Water Quality Board National Water Quality Monitoring (April 1974 - March 1978); and
- Toxic Chemical Survey (1985).

Parameters monitored included the following: major ions, physical parameters, nutrients, metals and toxic substances.

10.2 Mill River Watershed Study (1978)

During the period 1976-77 an assessment was performed on the Mill River subwatershed and a report subsequently produced for the Prince Edward Island Department of Environment and Environment Canada (Murphy and Matte, 1988). The intent of the study was to determine the extent of

bacterial contamination in the river, the sources of contamination and any exacerbating factors.

The assessment focused upon a sampling program which used thirty-two (32) stations in the Mill River and its tributaries for assistance in identifying sources of bacterial contamination. Ground surveys were also performed in order to identify specific sources of contamination.

11.0 ACTIVITIES AFFECTING SURFACE RESOURCES WITHIN THE MILL - TROUT RIVERS WATERSHED COMPLEX

Activities affecting the quality and/or quantity of surface water resources within the Mill - Trout Rivers Watershed Complex can be grouped into three general categories, namely; sedimentation (siltation) sources, pollution point sources and instream obstructions.

11.1 Sedimentation (Siltation) Sources

The entry of soil into surface waterways is described by the Watershed Inventory Project as a sedimentation (siltation) source. Siltation of surface waterways occurs as a result of the high erodibility of P.E.I. soils. Formed by the breakdown of underlying sedimentary bedrock, the topsoil is especially prone to destabilization caused by natural weathering and is accelerated by poor agricultural, highway construction and maintenance and forestry practices. Rivers are often seen flowing red as a result of soil particles suspended in the water column.

Due to the nature of the agricultural operations within the Mill - Trout Rivers Watershed Complex, sedimentation of the waterways constitutes a major concern. Autumn tillage, particularly plowing with the slope, and cultivation excessively close to the stream's edge, often results in extensive landwash and siltation. Improper forestry operations, such as clearcutting on steep slopes and the removal of greenbelts along streams and rivers may provide for additional silt-loading.

One of the major sources of siltation to Island waterways is caused by the construction and maintenance of P.E.I. roads. Many roads on the Island are unpaved which presents numerous potential sources of sedimentation. Improper grading of these roads, in particular, leaving a ridge of clay and sand at either edge allows runoff water to form channels causing erosion to the road surface. Water usually flows alongside these ridges until it "breaks" through, usually at a road-stream intersection. This practice of grading also renders ditches, if present, useless.

11.1.1 Foxley River

The Foxely River, an extension of the Trout River (Map 21I/16) is heavily silted from adjacent farming operations and is choked with alders.

11.1.2 Mill Road

Stock watering on this part of the Oyster River (Map 21I/9), a tributary of the Foxely River, has resulted in pitting of the river bed.

11.1.3 Meggisons Creek

Stock watering on the upstream side of this road-stream intersection (Map 21I/16), a secondary tributary of the Mill River, has caused considerable bank destabilization and pitting of the stream bed.

11.1.4 St. Anthony

A gravel pit with unstabilized sides is contributing to silt loading of the Mill River (Map 21I/9). An ineffective measure to reduce the impact of the problem had been attempted using bales of straw to attempt to slow the water's velocity.

11.1.5 O'Leary

Stock watering in an intermittent tributary of the Trout River has caused stream bed pitting and bank destabilization (Map 21I/9).

11.1.6 Rosebank I

Runoff from plowed fields in this area has created large siltbeds and sandbars within the stream (Map 21I/16). Fields are plowed to the edge of the bank which aggravates the problem.

11.1.7 Rosebank II

A breached bypass pond at this location constitutes a siltation source (Map 21I/16).

11.1.8 Forestview

Stock watering over a lengthy portion of Carruthers Brook (Map 21I/9), a tributary of the Mill River, has resulted in extensive pitting of the stream bed and bank destabilization.

11.2 Pollution Point Sources

The entry of non-natural substances into a surface waterway is known as a pollution point source. For example, fertilizer

and manure runoff into surface waterways results in bacterial and chemical contamination of the system. Inadequately or improperly treated human sewage, stormwater drainage and the discharge of industrial effluents also contribute to the deterioration of P.E.I.'s surface water quality.

The most recent examples of pollution point sources on the Island have been the entry of petroleum products, specifically gasoline, into streams, rivers and groundwater aquifers. This has resulted from either transportation accidents or leakage from underground storage tanks.

In many cases, the result of these pollution point sources is the eutrophication of the aquatic system. As is the case with siltation, the effects of many pollution point sources are felt in downstream areas. This can, for example, result in the closure of shellfish harvesting areas.

11.2.1 O'Leary

Waste water from Amalgamated Dairies Limited is being discharged into an unnamed tributary of the Trout River (Map 21I/9).

11.2.2 Locke Road

Leachate from a manure pile located on the side of the road is running directly into the upper reaches of Carruthers Brook (Map 21I/9), a tributary of the Mill River.

11.3 Instream Obstructions

Numerous other factors also influence the quality of Prince Edward Island's waterways. Fallen trees or other debris in the streams and rivers present problems for fish passage. Improperly installed culverts, insufficient water flow and non-existent or inadequate dam bypass structures not only pose barriers to successful fish passage but also affect the amount of water available in downstream areas for other users.

11.3.1 Causeway Interruption of Tidal Flows

Insufficient exchange of water at a number of causeways within the watershed (Maps 21I/9 and 21I/16) contributes to increased algal growth and subsequent eutrophication of waters upstream of the obstruction. Although wintering waterfowl benefit by the creation of ice-free areas these structures are generally deleterious to water quality and wildlife.

The following intersections represent restrictions of waterflow to some degree:

Mill River Route #12

Trout River	Route #12
MacDonalds River	Branch of Route #12 (Tory Road)
Canadian Creek	Route #168
Long Creek	Route #171
Meggisions Creek	Route #171

11.3.2 Milligans Pond

A beaver dam situated at the head of the bypass channel on Milligans Pond (Map 21I/9) presents a complete barrier to fish passage. A beaver lodge was also noted on the pond.

11.3.3 Mill River Golf Course I

A series of three small man-made ponds along this tributary of the Mill River, each having one or more drop-inlet outflows are complete barriers to fish passage. An impoundment near the mouth of the stream effectively blocks any passage upstream (Map 21I/9).

11.3.4 Mill River Golf Course II

Two impoundments on this stream, each having drop-inlet outflows, are complete barriers to fish passage in this unnamed Creek (Map 21I/9), a tributary of the Mill River.

11.3.5 Kelly Road

A dam has its overflow culvert situated so that there is a vertical drop of 0.25 metres with no plunge pool (Map 21I/9). This represents a complete barrier to fish passage and a restriction in waterflow during dry periods.

11.3.6 Rosebank

The angle of the culvert at the intersection of Long Creek and Route #149 (Map 21I/16) is greater than fifteen degrees (15°). The vertical drop is 0.21 metres and the plunge pool depth is 0.22 metres. The structure represents a complete barrier to fish passage.

11.3.7 Bloomfield

The culvert at the intersection of Cains Brook, a tributary of the Mill River and Route #148 (Map 21I/16) has been installed in such a way that water flow is too shallow to allow fish passage during dry weather and represents a barrier to fish passage during these periods.

11.3.8 MacAuslands Mill

The dam at MacAuslands Mill (Map 21I/16) on Cains Brook, a tributary of the Mill River, does not have a fishway thus posing a complete barrier to fish passage.

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APPENDIX

APPENDIX A

MILL - TROUT RIVER WATERSHED COMPLEX

Location	Condition/Remarks	UTM Coordinates
Green Point	No dam. Good size pond with good drainage. Should not pose a barrier to fish passage.	416000 - 5179600
Mill River	Upper reaches of stream. No visible impoundment. Any fish passage already blocked downstream.	411400 - 5176600
Profitts Semi-Natural Rearing Pond	Complete barrier to fish passage. Abandoned pool and weir fishway. Drop inlet water control structure.	410700 - 5181200
MacAuslands Pond	Complete barrier to fish passage.	409800 - 5178400
Carruthers Brook I	Breached; no barrier to fish passage.	407600 - 5176500
Carruthers Brook II	Breached; no barrier to fish passage.	406200 - 5176300
Carruthers Brook III		403600 - 5174800
Carruthers Brook IV	Breached; no barrier to fish passage.	402700 - 5174600
Rosebank I	By-pass pond which is breached.	410500 - 5182500
Rosebank II	Culvert is set too high in stream crossing, thereby creating a pond and a complete barrier to fish passage.	412400 - 5182400
Cascumpec I	No barrier - impoundment noted.	416900 - 5175700
Cascumpec II	Not able to locate.	417500 - 5174700
Milligans Pond	Beaver dam creates a complete barrier in the by-pass channel.	422600 - 5170900
Carleton	Breached	411400 - 5171700
Leards Pond	Complete barrier to fish passage. Wooden floor bridge.	408200 - 5171200

Location	Condition/Remarks	UTM Coordinates
Mill River Golf Course Dams	Drop inlet, 3 overflow culverts; complete barrier to fish passage.	411800 - 5177500
	Complex series of small ponds with natural overflows, fish could likely navigate most of these but passage is completely blocked into this stream system at above dam.	411800 - 5177400
	Two drop inlet, two overflow culverts, water is held here, pumped through a near-by pump/irrigation system for watering nearby greens.	411400 - 5176800
	Drop inlet.	411500 - 5176900
	Large drop inlet, provides a complete barrier to fish passage into this stream.	411300 - 5177300